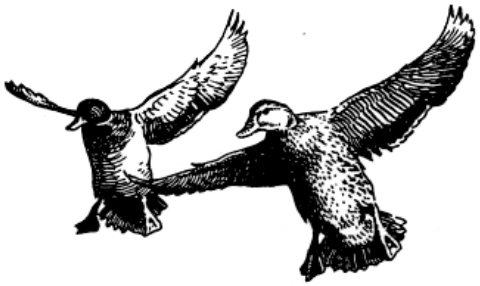
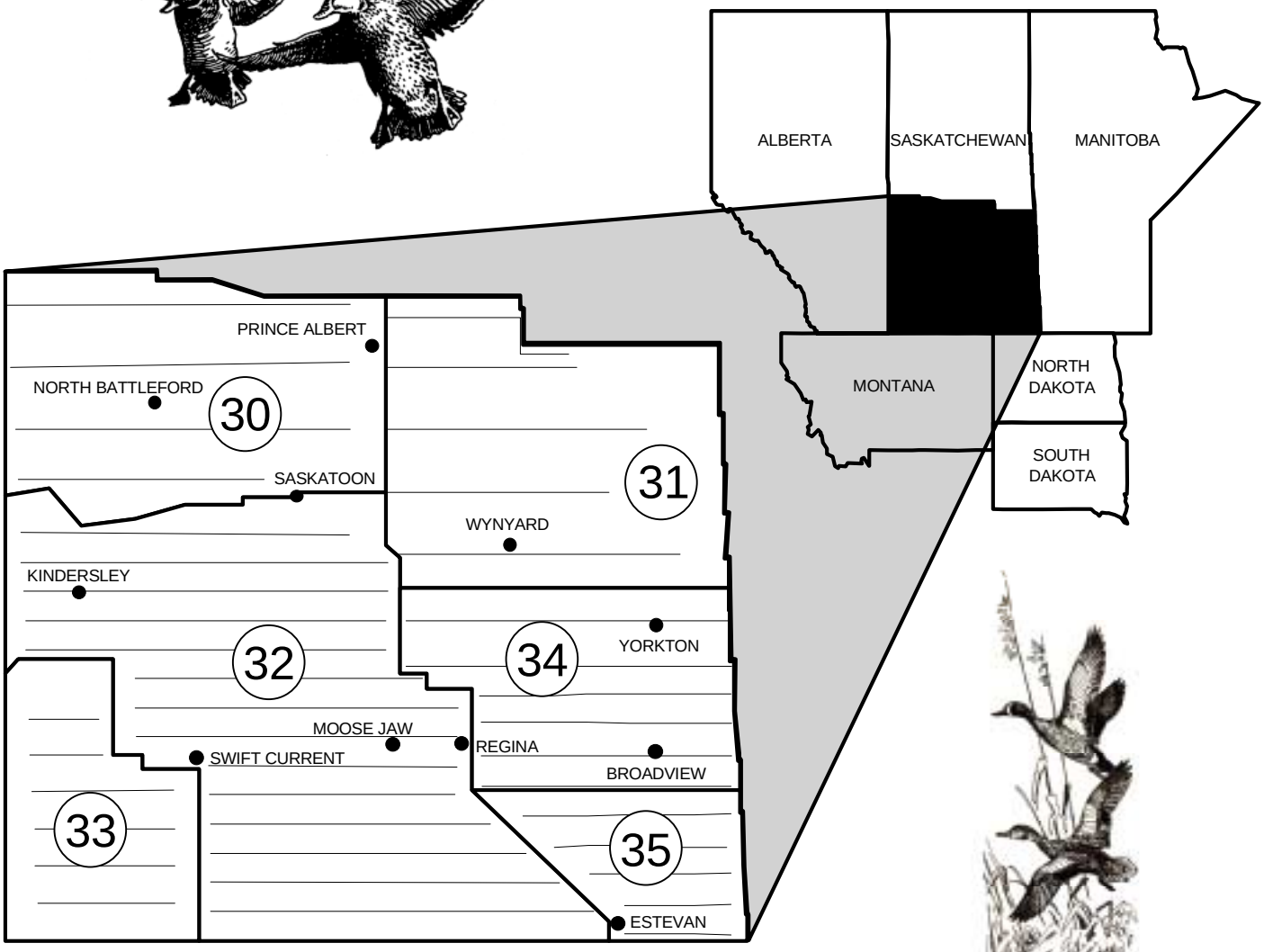
WATERFOWL PRODUCTION SURVEY
SOUTHERN SASKATCHEWAN
2000





U.S. Department of the Interior
Fish and Wildlife Service
and
Environment Canada
Canadian Wildlife Service

TITLE: Waterfowl Production Survey for Southern Saskatchewan

STRATA SURVEYED: 30, 31, 32, 33, 34, and 35

DATES: July 7-20, 2000

DATA SUPPLIED BY: United States Fish and Wildlife Service

Air Crew

Strata 30, 31, 32, and 33
Pilot/Observer - Phil Thorpe, Flyway Biologist, USFWS
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Strata 34 and 35
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ABSTRACT: Above to well-above normal precipitation fell across the southern third and eastern parts of the reporting area in June. Normal precipitation was received across central portions of Southern Saskatchewan and below normal precipitation was received in northwestern and extreme western areas of the Province. Pond indices were down 15% from last July, but up 10% and 50% from the 10-year and long-term means, respectively. The overall brood index was up 11% from last year and 40% from the 10-year mean, but remained below the long-term mean (-24%). The late-nesting index was 13%, 58%, and 14% above 1998, the 10-year mean, and the long-term mean, respectively. Early nest success reports were generally poor across the Province; however, with improved habitat conditions and high late-nesting indices the breeding season may have been salvaged. Overall, average recruitment is expected out of Southern Saskatchewan this year.

METHODS: The procedures followed in conducting the July Waterfowl Production Survey are described in the Standard Operating Procedures for Aerial Waterfowl Breeding Population and Habitat Surveys in North America, Section IV, revised 1987. There were no changes made this year in operating procedures. Survey coverage was complete and all data are considered comparable to previous years (Table 1). A Cessna 182 and a Cessna 206 amphib were used to survey strata 30-33 and strata 34-35, respectively. A GPS/voice recording system was used to collect data (see "Waterfowl Breeding Population Survey for Southern Saskatchewan, 2000" for details on the system). During the period 7-20 July, approximately 63 and 17 hours of flight time were required to complete the transect flights in strata 30-33 and 34-35, respectively. There were two days lost because of weather in strata 30-33 and one weather day in strata 34-35.

WEATHER AND HABITAT CONDITIONS: Since the May survey, precipitation in Southern Saskatchewan was excessive (>200% of normal) in the southern third of the Province, above average (115-150% of normal) in strata 31, 34, and 35, and average to below average (40-80% of normal) in stratum 30. Widespread flooding in the southern half of Stratum 32 and most of stratum 33 was more typical of how the area appears in May after an above average spring

runoff. One storm deluged the town of Vanguard in southwest Saskatchewan with its average annual rainfall (330 mm) in a 10-hour period.

A normal decline in pond numbers from May to July occurred in strata 30-31; however, uncommon increases occurred in strata 33-35 reflecting the above normal precipitation received across the southern third of the reporting area. The combined pond index was down 15% from July 1999, but remained 10% above the 10-year mean and 50% above the long-term mean (LTM) (Table 2).

According to the July 25 Crop Report (Saskatchewan Agriculture and Food, July 25, 2000, Report No. 17), pasture and hayland was rated as fair in the northwest and central grainbelt and good in the eastern and southern grainbelt. Topsoil moisture was rated as poor to fair in northwest and central areas and good to excessive in eastern and southern parts of the Province. Temperatures during June and July were generally 1-2^{o} C below normal.

PRODUCTION INDICES: The overall brood index was up 11% from last year and 40% from the 10-year mean, but down 24% from the LTM (Table 3). The composition of duck broods (n = 515) by age class (Gollup and Marshall 1954) was as follows: Class I, 25% (n = 129); Class II, 49% (n = 250); Class III, 25% (n = 128); unclassified, 1% (n = 8). The weighted average brood size among the intact Class II and III broods observed during our survey (n = 224) was 5.4, which was below last year (0 = 6.6), but about the same as the 10-year mean (0 = 5.5) and the LTM (0 = 5.2) (Table 3). The coot brood index was 10% above the 1999 index, 48% above the 10-year mean, and 34% above the LTM (Table 3). The 2000 coot brood index was the 10th highest on record (Appendix 1).

LATE-NESTING INDICES: The late-nesting index (LNI) is a rough measure of renesting effort, or potential broods that will hatch after our survey (Henny et al. 1972). The 1998 LNI was used for comparisons against this year because of mistakes in collecting data in strata 34-35 in 1999. Instead of only counting lone drakes and pairs the observer counted all social groupings of ducks, which led to an artificially high individual and total LNI for 1999. This year's combined LNI was 13% above 1998 and 58% above the 10-year mean (Table 3). The 2000 LNI was the 16th highest on record and one of the highest since the early 1980s (Appendix 1). When combining this year's brood index with the LNI (188.6), 2000 ranks 18th since 1955 (Appendix 1).

DISCUSSIONS: Conditions similar to 1998 were present again this year in Southern Saskatchewan. Water conditions were considered good to excellent over much of the surveyed area and wetland distribution had improved dramatically from May. Unfortunately, these conditions did not improve until mid to late June and occurred too late for ducks to take full advantage of them. The lack of wetlands in the grasslands (Strata 32-33) during the spring resulted in ducks crowding the few remaining wetlands. Although wetlands in the grasslands had excellent brood water in July, we saw few broods or breeding birds using them. However, in the Parklands (Strata 30-31, 34) where wetlands were in fair to good condition during the spring, ducks were able to isolate themselves on breeding wetlands and, with the improved conditions, continue a late-nesting effort. The LNI for mallards was 73% above the 10-year mean, which would indicate that a strong renesting effort might have been underway during the survey.

Reports from ground studies conducted in three areas of Southern Saskatchewan by Ducks Unlimited Canada indicated that nest success was poor in the northern Parklands, but good in the

Allan Hills southeast of Saskatoon (J. Devries, June 2000 PHJV Assessment Study Update). Brood survival was reported to be good in the Allan Hills and at the Leask study site (north central stratum 30).

Given the poor spring in the southern and western parts of the Province production is expected to be poor out of the grasslands. Because the southeast, northeast and far northern areas of the reporting area had fair to good wetland and habitat conditions during May, fair to good production should come out of these areas. Overall, the Southern Saskatchewan reporting area will likely have average recruitment into the fall flight of ducks.

Submitted by Phil Thorpe, July 27, 2000

LITERATURE CITED

Drought Watch on the Prairies. 2000. Agriculture and Agri-Food Canada. (http://www.agr.ca/pfra/drought.htm).

Gollup, J. B., and W. H. Marshall. 1954. A guide for aging duck broods in the field. Mississippi Flyway Council Technical Section, Minneapolis, MN. 14pp.

Henny, C. J., D. R. Anderson, and R. S. Pospahala. 1972. Aerial surveys of waterfowl production in North America, 1955-1971. U.S. Fish and Wildlife Service Special Scientific Report 160.

Table 1. Survey design and July 2000 coverage for Southern Saskatchewan.

	Stratum						
	30	31	32	33	34	35	Total
Survey design:							
Square miles in stratum	18,570	21,086	37,911	11,345	13,164	9,044	111,120
Square miles in sample - waterfowl/ponds	76.50	72.00	285.75	45.00	87.75	63.00	630.00
Linear miles in sample	612	576	2,286	360	702	504	5,040
Number of transects in sample	4	5	14	6	5	6	40
Number of segments in sample	34	32	127	20	39	28	280
Expansion factor	242.745	292.861	132.672	252.111	150.017	143.556	
July 2000 coverage:							
Square miles in sample - waterfowl/ponds	76.50	72.00	285.75	45.00	87.75	63.00	630.00
Linear miles in sample	612	576	2,286	360	702	504	5,040
Number of transects in sample	4	5	14	6	5	6	40
Number of segments in sample	34	32	127	20	39	28	280
Expansion factor	242.745	292.861	132.672	252.111	150.017	143.556	

Table 2. Long-term trend in July pond estimates[1] (thousands) by stratum with comparisons against the previous year, the 10-year mean (1990-1999), the long-term mean (1955-1999), and May 2000 pond estimates [2] for Southern Saskatchewan.

	Stratum						
Year	30	31	32	33	34	35	Total
1955	138.6	332.1	374.5	120.5	668.5	449.0	2,083.2
1956	120.9	186.8	210.1	34.8	346.5	216.2	1,115.3
1957	59.0	136.8	127.6	18.9	260.8	77.4	680.5
1958	57.0	82.8	69.1	18.4	127.9	46.1	401.3
1959	40.1	95.9	123.0	31.5	155.6	74.1	520.2
1960	47.3	104.0	136.8	16.9	229.7	102.5	637.2
1961	41.0	35.6	51.1	10.3	32.8	22.4	193.2
1962 [3]	29.9	40.0	62.6	12.4	-	-	144.8
1963	93.0	97.2	227.8	41.6	177.5	89.4	726.5
1964	33.5	82.5	99.2	13.1	141.9	144.3	514.5
1965	112.4	188.7	289.1	88.7	167.5	69.5	915.9
1966	149.0	320.8	239.9	72.9	164.3	105.2	1,052.1
1967	86.4	136.5	192.6	44.6	101.1	50.2	611.6
1968	66.3	96.2	88.5	15.9	41.1	20.2	328.2
1969	125.4	151.8	357.0	63.0	86.6	159.2	943.1
1970	278.3	365.8	568.2	70.1	219.3	209.6	1,711.4
1971	159.1	277.5	335.9	41.9	171.7	91.6	1,077.7
1972	116.5	189.7	154.8	25.2	108.0	107.4	701.6
1973	153.1	442.7	145.3	21.7	103.5	52.4	918.6
1974	262.5	309.9	455.3	57.5	252.5	175.0	1,512.7
1975	216.7	299.6	391.1	69.1	282.5	281.9	1,540.8
1976	165.1	254.5	414.3	55.2	266.7	211.5	1,367.3
1977	101.6	187.4	183.0	19.9	154.1	72.2	718.1
1978	82.1	177.8	240.1	50.4	165.3	135.7	851.4
1979	159.6	230.8	274.2	46.9	169.2	155.8	1,036.4
1980	77.3	109.8	90.4	21.9	63.0	32.7	395.1
1981	75.7	87.0	96.3	22.9	52.2	29.6	363.7
1982	130.9	197.1	372.5	122.0	86.0	55.4	963.9
1983	134.8	313.9	237.5	44.1	366.3	99.1	1,195.7
1984	126.8	218.8	140.1	21.7	103.4	41.9	652.6
1985	186.2	292.9	173.8	20.9	177.5	55.8	907.1
1986	188.0	218.8	170.0	36.3	171.3	90.0	874.3
1987	126.8	183.3	123.7	27.7	115.1	63.0	639.6
1988	120.4	126.5	94.1	36.6	41.3	23.4	442.2
1989	101.2	108.4	129.6	36.3	51.6	31.9	459.0
1990	101.2	135.0	135.5	21.7	96.3	48.8	538.5
1991	187.4	210.6	722.3	165.6	228.5	177.1	1,691.5
1992	87.6	101.6	132.5	24.5	135.5	77.4	559.1
1993	237.9	271.5	301.0	47.6	281.1	136.8	1,276.0
1994	248.8	314.5	501.6	74.1	256.5	110.4	1,506.0
1995	122.1	252.7	237.6	77.9	261.8	115.4	1,067.6
1996	227.2	306.0	464.4	82.4	380.1	206.4	1,666.6
1997	158.8	271.8	430.8	86.0	310.4	169.8	1,427.5
1998	158.0	325.7	311.9	73.4	476.2	320.0	1,665.2
1999	201.2	405.6	684.6	47.4	205.5	149.4	1,697.1
2000	124.1	201.5	299.9	52.1	446.5	313.8	1,437.9
10-year mean	173.0	259.5	392.2	70.1	263.2	151.2	1,309.2
Long-term mean	133.2	209.9	256.8	48.6	192.1	117.1	957.8
Percent Change from:							
1999	-38%	-50%	-56%	10%	117%	110%	-15%
10-year mean	-28%	-22%	-24%	-26%	70%	108%	10%
long-term mean	-7%	-4%	17%	7%	132%	168%	50%
May ponds 2000	214.4	272.9	322.5	36.6	348.1	209.2	1,403.7
Percent change:							
May to July 2000	-42%	-26%	-7%	42%	28%	50%	2%

[1] July ponds are raw counts multiplied by an expansion factor (Table 1) and are not adjusted for visibility bias.

[2] May ponds are raw counts multiplied by an expansion factor (Table 1) and are adjusted using a visibility correction factor of 1.33 for strata 30-33 and 0.70 for strata 34-35.

[3] Incomplete coverage, not included in long-term mean calculation.

Table 3. Status of waterfowl brood and late-nesting indices (thousands, unadjusted for visibility bias) by stratum with comparisons against the previous year [1], the 10-year mean (1990-1999) [2], and the long-term mean (1955-1999) [2] for Southern Saskatchewan, July 2000.

	Stratum						2000	1999/1998 [1]	10-year	Long-term	Percent Change from:		
Species	30	31	32	33	34	35	total	total	mean	mean	1999/1998 [1]	10-year mean	Long-term mean
Broods:													
Duck brood index	21.8	15.7	23.5	1.0	20.3	9.2	91.5	82.3	65.5	120.3	11%	40%	-24%
Average brood size [3]	5.5	5.3	4.8	4.0	5.9	5.9	5.4	6.6	5.5	5.2	-21%	-5%	1%
Coot brood index	13.4	4.6	1.9	0.0	14.1	3.3	37.3	41.5	25.2	27.8	-10%	48%	34%
Late nesting index: [4]													
Dabblers:													
Mallard	3.1	7.6	12.9	1.0	4.8	3.9	33.2	26.6	19.2	27.4	25%	73%	21%
Am. Black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%
Gadwall	0.8	1.2	3.7	1.3	1.1	1.1	9.1	11.1	8.5	9.4	-18%	7%	-3%
Am. wigeon	0.5	0.3	0.7	0.0	0.8	0.3	2.5	1.9	2.8	4.6	33%	-9%	-45%
Green-winged teal	0.3	2.3	2.8	0.0	0.2	0.3	5.9	9.1	3.2	2.9	-36%	81%	100%
Blue-winged teal [5]	1.0	1.2	6.0	0.8	0.9	1.7	11.5	15.0	10.3	12.2	-23%	12%	-5%
N. shoveler	0.3	0.6	1.9	0.5	0.2	0.4	3.8	2.4	2.2	3.7	59%	71%	2%
N. Pintail	0.8	0.6	1.9	0.5	0.2	0.7	4.6	4.3	2.8	7.1	8%	66%	-34%
Subtotal:	6.7	13.6	29.8	4.0	8.0	8.5	70.6	70.4	49.0	67.3	0%	44%	5%
Divers:													
Redhead	0.0	0.0	0.7	0.5	0.2	0.0	1.3	2.7	1.6	2.3	-51%	-17%	-42%
Canvasback	0.8	0.3	0.1	0.0	0.2	0.0	1.3	0.7	0.6	1.3	92%	117%	4%
Scaups	0.8	0.9	2.2	0.3	0.2	0.0	4.2	2.8	2.4	6.5	51%	78%	-35%
Ring-necked duck	0.5	1.2	1.1	0.0	0.0	0.1	2.9	0.2	0.7	0.7	1352%	342%	296%
Goldeneyes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0%	-100%	-100%
Bufflehead	0.8	1.5	0.3	0.0	0.0	0.0	2.5	0.7	0.3	0.5	256%	793%	383%
Ruddy duck	2.1	3.5	4.9	0.3	1.8	1.1	13.6	8.0	6.5	6.2	70%	111%	121%
Subtotal:	2.2	1.2	9.6	1.6	2.3	1.3	25.9	15.1	12.3	17.7	72%	110%	46%
Miscellaneous:													
Oldsquaw	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%
Scoters	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	-100%	400%	-78%
Mergansers	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.1	0.1	112%	316%	661%
Subtotal	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.2	0.3	6%	198%	77%
Total ducks	12.1	20.9	39.1	5.1	10.2	9.8	97.1	86.0	61.5	85.4	13%	58%	14%

[1] The 1999 LNI for strata 34-35 was not collected according to survey methodology, therefore, the 1998 LNI was used for comparison. The brood index, average brood size, and coot brood index for 1999 were collected correctly and were used for comparison.

[2] The LNI for 1999 is not included in the long-term or 10-year mean because of incorrect data for stratum 34-35. Long-term mean based on 43 years, does not include 1962, which had incomplete coverage.

[3] Calculated using only Class II and III broods observed and assumed to be complete.

[4] Only observed adult pairs and singles used.

[5] Includes cinnamon teal.

Appendix 1. Long-term trend in waterfowl brood and late-nesting indices (thousands, unadjusted for visibility bias) by species in Southern Saskatchewan, 1955-2000.

Species/Year	1955	1956	1957	1958	1959	1960	1961	1962 [1]	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Broods:																				
Duck brood index	236.2	368.6	588.7	275.5	103.8	121.0	71.9	28.5	46.2	67.8	46.8	95.9	94.6	77.8	175.0	128.7	180.2	170.2	96.7	148.3
Average brood size [2]	6.7	6.0	6.2	4.2	4.1	4.7	4.6	5.5	5.4	5.8	6.0	5.8	5.4	5.0	5.6	5.3	5.2	5.2	4.7	5.0
Coot brood index	18.9	65.0	208.0	21.6	5.9	15.1	5.8	0.0	1.9	9.0	6.8	8.0	11.6	11.9	20.7	22.4	35.6	25.6	21.4	40.6
Late nesting index: [3]																				
Dabblers:																				
Mallard	90.4	52.3	27.1	49.7	23.6	40.8	5.7	5.9	15.4	10.9	29.8	25.8	14.8	12.4	30.5	65.4	37.0	25.6	33.1	37.2
Am. Black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	11.9	9.2	2.1	4.4	1.3	9.7	0.3	1.3	5.8	2.2	13.1	9.5	8.9	4.8	18.9	23.0	10.8	6.2	9.2	16.6
Am. wigeon	10.5	8.9	2.7	7.6	4.4	5.9	0.3	1.3	2.0	0.1	5.5	3.7	4.0	2.1	11.5	24.2	9.0	6.2	5.4	4.4
Green-winged teal	3.0	2.5	0.4	1.4	0.3	0.4	0.0	0.0	0.6	0.0	1.6	1.7	1.9	3.2	2.9	11.8	7.4	5.2	4.8	1.0
Blue-winged teal [4]	35.3	30.6	6.1	18.5	18.4	12.7	1.0	0.7	5.2	3.8	11.4	13.9	14.3	4.3	14.6	17.5	15.4	9.2	7.7	14.0
N. shoveler	10.6	7.2	1.4	3.8	1.2	3.9	0.4	0.3	1.7	1.1	6.7	2.7	3.6	1.4	6.9	13.2	6.1	1.8	3.8	6.2
N. Pintail	23.9	11.1	3.8	8.6	1.1	3.6	0.8	2.3	4.3	0.8	4.7	6.3	5.4	3.2	19.0	41.1	24.0	8.0	5.0	11.9
Subtotal:	185.6	121.7	43.6	93.9	50.3	77.1	8.4	11.8	35.0	19.0	72.8	63.7	52.9	31.3	104.4	196.3	109.8	62.3	69.1	91.2
Divers:																				
Redhead	4.2	5.5	0.9	2.4	0.4	1.7	0.0	0.3	1.0	1.1	2.3	2.1	2.8	1.5	2.1	3.5	1.9	2.6	2.1	2.7
Canvasback	5.6	2.6	0.5	1.8	0.9	0.4	0.2	0.0	0.5	0.3	0.7	0.3	1.1	1.4	0.5	3.9	2.2	1.1	2.7	1.7
Scaups	18.4	11.9	12.3	10.2	3.9	5.2	0.8	0.3	1.9	4.0	2.3	5.1	1.7	1.4	6.8	13.7	8.3	7.4	6.4	6.6
Ring-necked duck	2.4	0.1	0.2	0.8	0.7	0.0	0.1	0.0	1.1	0.0	0.5	0.3	0.3	0.0	0.1	0.5	0.0	0.2	0.9	1.9
Goldeneyes	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.4	0.0
Bufflehead	0.8	0.0	0.0	0.0	0.2	0.0	0.3	0.0	0.0	0.1	0.6	1.6	0.6	0.5	2.1	0.5	0.5	0.2	0.4	0.7
Ruddy duck	10.8	9.5	3.0	5.3	3.0	3.9	0.1	0.4	2.7	1.7	2.7	6.3	5.4	3.7	3.5	3.4	12.3	6.7	5.6	10.5
Subtotal:	42.3	29.7	16.8	20.6	9.4	12.0	1.7	0.9	7.2	7.2	9.0	15.6	12.0	8.5	15.1	27.1	25.1	18.3	18.4	24.1
Miscellaneous:																				
Oldsquaw	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	1.7	0.2	0.0	0.2	0.5	0.7	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Mergansers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Subtotal	1.7	0.2	0.0	0.2	0.5	0.7	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.2	0.0
Total ducks	229.6	151.7	60.4	114.7	60.2	89.8	10.0	12.7	43.1	26.3	81.9	79.3	64.9	39.9	119.9	223.4	134.9	80.6	87.8	115.4

[1] Incomplete survey coverage.

[2] Calculated using only Class II and III broods observed and assumed to be complete.

[3] Only observed adult pairs and singles used.

[4] Includes cinnamon teal.

Appendix 1 (continued).

Species/Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Broods:																				
Duck brood index	148.2	169.0	144.6	130.0	107.2	130.6	77.9	63.3	69.5	70.6	94.9	100.9	105.4	74.3	58.4	68.3	58.5	63.2	19.2	87.8
Average brood size[2]	4.7	4.5	5.2	4.7	5.3	4.6	4.3	4.8	4.5	4.7	5.3	5.7	5.2	4.6	4.7	4.3	5.4	5.1	4.8	6.2
Coot brood index	45.0	46.0	24.8	28.3	34.0	34.2	12.5	14.8	15.6	21.6	34.9	54.3	32.9	11.6	6.4	18.9	7.2	29.5	3.8	12.5
Late nesting index[3]:																				
Dabblers:																				
Mallard	45.7	40.3	36.1	26.4	51.9	14.2	15.4	34.6	32.1	16.2	20.7	13.3	7.9	5.4	8.9	10.7	23.7	19.6	13.7	19.5
Am. Black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	17.6	25.3	20.3	15.6	19.2	4.3	7.2	17.1	8.6	1.1	6.5	6.0	1.3	0.1	1.8	3.4	16.5	10.5	6.3	4.5
Am. wigeon	7.0	6.8	4.9	4.5	8.9	1.0	2.4	6.3	2.8	1.4	2.2	1.7	0.3	1.5	0.8	0.9	5.9	3.7	3.4	2.7
Green-winged teal	4.8	7.4	2.6	2.9	6.9	2.1	2.7	3.1	3.8	1.5	1.8	2.8	0.3	0.8	0.5	1.2	3.0	0.7	0.5	1.9
Blue-winged teal [4]	12.1	21.4	22.4	9.3	21.6	8.7	8.9	13.4	14.4	12.2	7.5	9.8	1.6	4.6	2.2	3.3	13.0	6.8	6.6	6.3
N. shoveler	9.4	14.9	4.8	3.0	5.7	1.2	2.7	4.8	4.4	0.1	1.7	0.9	0.3	0.7	0.1	1.1	4.5	1.6	1.1	1.6
N. Pintail	15.2	15.3	13.8	8.1	9.1	4.4	4.1	4.3	4.8	2.7	3.4	1.4	0.7	1.5	0.4	0.8	3.0	3.0	1.3	2.4
Subtotal:	111.8	131.4	104.8	69.7	123.4	35.9	43.5	83.7	70.8	35.3	43.7	35.9	12.2	14.5	14.6	21.3	69.6	45.9	33.1	38.9
Divers:																				
Redhead	7.1	8.1	4.4	2.9	5.5	3.2	1.5	2.7	3.7	0.6	1.9	0.4	0.1	0.2	0.0	0.7	1.4	3.1	0.5	1.3
Canvasback	2.2	2.8	5.7	1.6	2.0	1.0	0.6	0.3	1.3	1.0	0.7	0.8	1.0	0.0	0.0	0.1	0.7	0.6	1.1	0.3
Scaups	10.1	12.4	13.7	11.2	24.6	3.7	5.1	12.4	13.7	8.7	6.5	3.1	2.2	0.6	1.4	1.8	1.5	3.9	1.9	1.8
Ring-necked duck	1.1	1.9	1.2	1.6	3.1	0.8	0.3	1.0	0.9	0.0	1.0	0.5	0.4	0.8	0.0	0.9	0.0	0.5	0.8	0.5
Goldeneyes	0.0	0.0	0.0	0.2	0.6	0.0	0.2	0.0	0.9	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	1.5	0.6	0.3
Bufflehead	1.6	1.8	1.7	0.7	2.1	0.5	0.0	0.6	0.7	0.0	0.1	0.2	0.0	0.5	0.0	0.0	0.0	0.4	0.4	0.3
Ruddy duck	10.6	16.0	9.9	5.4	13.0	2.5	2.7	5.2	13.9	3.5	7.0	6.9	2.3	1.5	1.9	1.4	6.4	7.4	4.2	5.2
Subtotal:	32.7	42.9	36.6	23.6	50.8	11.6	10.4	22.2	35.1	13.8	17.5	11.9	6.2	3.6	3.3	4.9	10.0	17.4	9.5	9.7
Miscellaneous:																				
Oldsquaw	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	1.1	0.0	0.8	1.4	0.7	0.7	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Mergansers	0.0	0.0	0.0	0.3	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.2
Subtotal	1.1	0.0	0.8	1.6	0.7	1.1	0.0	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.0	0.0	0.2	0.2
Total ducks	145.6	174.2	142.3	94.9	174.9	48.6	53.9	106.0	105.9	49.1	61.2	47.9	18.6	18.1	17.9	26.6	79.5	63.3	42.8	48.8

[1] Incomplete survey coverage.

[2] Calculated using only Class II and III broods observed and assumed to be complete.

[3] Only observed adult pairs and singles used.

[4] Includes cinnamon teal.

Appendix 1 (continued).

Species/Year	1995	1996	1997	1998	1999[5]	2000
Broods:						
Duck brood index	78.9	129.3	161.3	67.3	82.3	91.5
Average brood size[2]	5.6	5.9	5.6	5.5	6.6	5.4
Coot brood index	6.7	63.5	48.5	19.8	41.5	37.3
Late nesting index[3]:						
Dabblers:						
Mallard	11.8	34.0	23.8	26.6	106.8	33.2
Am. Black duck	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	7.5	17.7	5.5	11.1	36.8	9.1
Am. Wigeon	2.1	4.6	1.7	1.9	3.6	2.5
Green-winged teal	1.3	10.1	4.2	9.1	16.5	5.9
Blue-winged teal [4]	7.6	31.9	10.2	15.0	37.0	11.5
N. shoveler	2.4	5.7	1.8	2.4	11.7	3.8
N. Pintail	3.0	3.8	5.9	4.3	6.6	4.6
Subtotal:	35.7	107.9	53.0	70.4	219.0	70.6
Divers:						
Redhead	1.5	3.1	1.8	2.7	10.4	1.3
Canvasback	0.9	0.5	1.3	0.7	0.9	1.3
Scaups	2.3	4.4	2.0	2.8	7.2	4.2
Ring-necked duck	1.3	2.1	0.2	0.2	3.8	2.9
Goldeneyes	0.0	0.4	0.5	0.0	0.3	0.0
Bufflehead	0.0	0.5	0.5	0.7	0.0	2.5
Ruddy duck	7.1	13.6	9.4	8.0	31.6	13.6
Subtotal:	13.1	24.8	15.7	15.1	54.2	25.9
Miscellaneous:						
Oldsquaw	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	0.0	0.0	0.0	0.2	0.0	0.0
Mergansers	0.0	0.2	0.3	0.2	0.4	0.5
Subtotal	0.0	0.2	0.3	0.5	0.4	0.5
Total ducks	48.8	133.0	69.0	86.0	273.6	97.1

[1] Incomplete survey coverage.
[2] Calculated using only Class II and III broods observed and assumed to be complete.
[3] Only observed adult pairs and singles used.
[4] Includes cinnamon teal.
[5] Late nesting data for strata 34 and 35 was not collected according to survey methodology, 1999 individual and total LNI are not used in averages or comparisons.